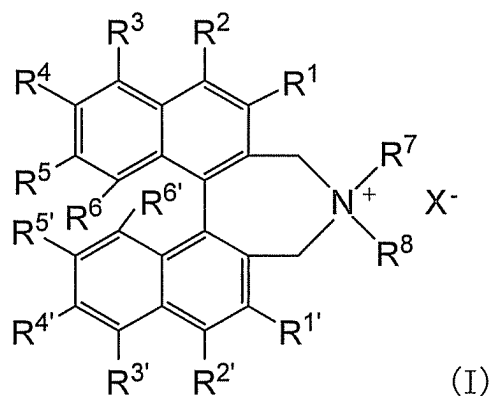


AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

## Listing of Claims:

1. (Currently amended) A compound represented by the following formula (I) below:



wherein  $R^1$ ,  $R^{1'}$ ,  $R^2$ ,  $R^{2'}$ ,  $R^3$ ,  $R^{3'}$ ,  $R^4$ ,  $R^{4'}$ ,  $R^5$ ,  $R^{5'}$ ,  $R^6$ , and  $R^{6'}$  are groups independently selected from the group consisting of :

- (i) a hydrogen atom;
- (ii)  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group);
- (iii) a cyano group;
- (iv) a nitro group;
- (v) a carbamoyl group;
- (vi) an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group;
- (vii) an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group;
- (viii)  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched);
- (ix) a  $C_1$  to  $C_6$  alkyl group that may be branched or form a cyclic group;

(x) a C<sub>2</sub> to C<sub>6</sub> alkenyl group that may be branched or form a cyclic group;

(xi) a C<sub>2</sub> to C<sub>6</sub> alkynyl group that may be branched or form a cyclic group;

(xii) an aralkyl group, wherein the aryl moiety of the aralkyl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(xiii) a heteroaralkyl group having a heteroaryl moiety, wherein the heteroaryl moiety may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each

independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(xiv) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
a halogen atom, and  
-S-R, -SO-R, or -SO<sub>2</sub>-R (where R is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched);  
or may be substituted with -O-CH<sub>2</sub>-O- or -O-(CH<sub>2</sub>)<sub>2</sub>-O- at positions 3 and 4 taken together; and

(xv) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
and

a halogen atom;

R<sup>7</sup> and R<sup>8</sup> are groups independently selected from the group consisting of:

- (i) a hydrogen atom;
- (ii) a C<sub>1</sub> to C<sub>12</sub> alkyl group that may be branched or form a cyclic group;
- (iii) a C<sub>2</sub> to C<sub>12</sub> alkenyl group that may be branched or form a cyclic group;

(iv) a C<sub>2</sub> to C<sub>12</sub> alkynyl group that may be branched or form a cyclic group;

(v) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(vi) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>

alkyl)carbamoyl group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

and

a halogen atom;

(vii)  $\text{-(CH}_2\text{)}_p\text{OCONR}^{10}\text{R}^{11}$  (where  $\text{R}^{10}$  and  $\text{R}^{11}$  are groups independently selected from the group consisting of:

(1) a hydrogen atom;

(2) a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched;

(3) a  $\text{C}_2$  to  $\text{C}_6$  alkenyl group that may be branched or form a cyclic group ;

(4) a  $\text{C}_2$  to  $\text{C}_6$  alkynyl group that may be branched or form a cyclic group ;

(5) an aralkyl group, wherein the aryl moiety of the aralkyl group may be substituted with at least one group selected from the group consisting of:

a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched,

a  $\text{C}_1$  to  $\text{C}_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched, a cyano group,  $\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group), a nitro group, a carbamoyl group, an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;  
(6) a heteroaralkyl group having a heteroaryl moiety, wherein the heteroaryl moiety may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

(7) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and

(8) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),



a cyano group,  
 $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,  
 an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,  
 $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched), and

a halogen atom;

and  $p$   $[[n]]$  is an integer from 1 to 12);

(viii)  $-(CH_2)_qCONR^{12}R^{13}$  (where  $R^{12}$  and  $R^{13}$  are groups independently selected from the group consisting of:

- (1) a hydrogen atom;
- (2) a  $C_1$  to  $C_4$  alkyl group that may be branched;
- (3) an aryl group, wherein the aryl group may be substituted with

at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,  
 a  $C_1$  to  $C_5$  alkoxy group that may be branched,  
 an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a cyano group,  
 $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
 a halogen atom; and  
 (4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:  
 a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
 a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
 an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
 a cyano group,  
 -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
 a halogen atom;  
 and  $g$   $[[n]]$  is an integer from 1 to 12);  
 (ix) -(CH<sub>2</sub>)<sub>r</sub>NR<sup>12</sup>COR<sup>13</sup> (where R<sup>12</sup> and R<sup>13</sup> are groups independently selected from the group consisting of:  
 (1) a hydrogen atom;  
 (2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;  
 (3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and  
(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,  
 a carbamoyl group,  
 an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;  
 and  $\underline{r}$   $[[n]]$  is an integer from 1 to 12);

(x) -(CH<sub>2</sub>)<sub>s</sub>NR<sup>12</sup>R<sup>13</sup> (where R<sup>12</sup> and R<sup>13</sup> are groups independently selected from the group consisting of:

(1) a hydrogen atom;  
 (2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;  
 (3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
 a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
 an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
 -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,  
 a carbamoyl group,  
 an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and  $\underline{s}$   $[[n]]$  is an integer from 1 to 12);

(xi) -(CH<sub>2</sub>)<sub>t</sub>Y-OR<sup>12</sup> (where Y is a C<sub>1</sub> to C<sub>4</sub> divalent saturated hydrocarbon group that may be branched, and R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be  
 branched), and

a halogen atom;

and  $\underline{t}$   $[[n]]$  is an integer from 1 to 12);

(xii) -(CH<sub>2</sub>)<sub>u</sub>-OR<sup>12</sup> (where R<sup>12</sup> is a group selected from the group  
 consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with  
 at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group  
 that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each  
 independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a  
 carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>  
 alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that  
 may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen  
 atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be  
 branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and  $\underline{u}$  is an integer from 1 to 12);

(xiii) -(CH<sub>2</sub>)<sub>v</sub>-S-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each



independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and  $\underline{v}$   $[[n]]$  is an integer from 1 to 12);

(xiv) -(CH<sub>2</sub>)<sub>w</sub>-SO-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
 an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
 -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;  
 and w [[n]] is an integer from 1 to 12); and

(xv) -(CH<sub>2</sub>)<sub>x</sub>-SO<sub>2</sub>-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;  
 (2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;  
 (3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
 a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
 an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>

alkyl)carbamoyl group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched,

a  $\text{C}_1$  to  $\text{C}_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched, a cyano group,  $\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group), a nitro group, a carbamoyl group, an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

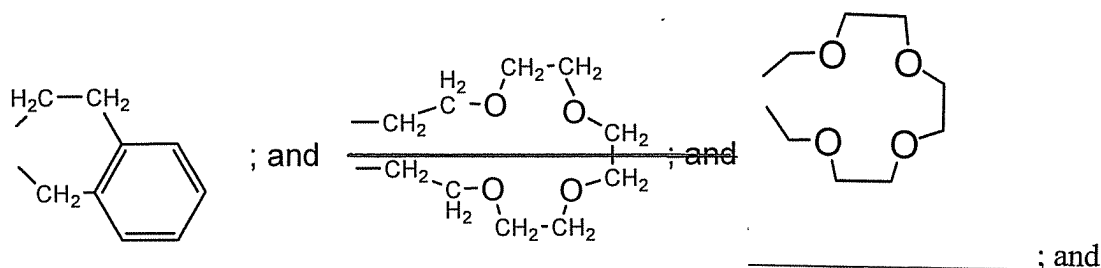
an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched), and

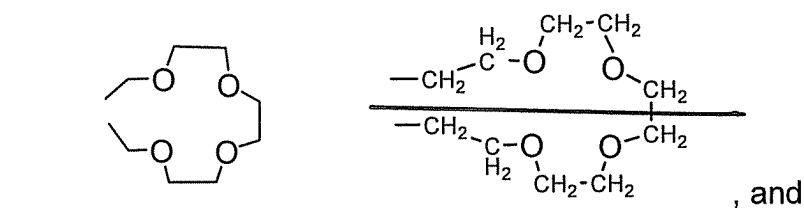
a halogen atom;

and  $\underline{x}$   $[[n]]$  is an integer from 1 to 12); or  $R^7$  and  $R^8$  are taken together to form a divalent group selected from the group consisting of:  $-(CH_2)_m$  (where  $m$  is an integer from 2 to 8);



wherein  $X^-$  is an anion selected from the group consisting of a halide anion,  $SCN^-$ ,  $HSO_4^-$  and  $HF_2^-$ ,

provided that in a case where  $R^1, R^{1'}, R^2, R^{2'}, R^3, R^{3'}, R^4, R^{4'}, R^5, R^{5'}, R^6$ , and  $R^{6'}$  are all hydrogen atoms and  $X^-$  is a halide anion,  $R^7$  and  $R^8$  are not both methyl groups, a combination of a methyl group and an n-butyl group, a combination of a methyl group and an isopropyl group, or a combination of an allyl group and a hydrogen atom, or  $R^7$  and  $R^8$  are not taken together to form  $-(CH_2)_4-$ ,  $-(CH_2)_5-$  or



further provided that in a case where  $R^1, R^{1'}, R^2, R^{2'}, R^3, R^{3'}, R^4, R^{4'}, R^5, R^{5'}, R^6$ , and  $R^{6'}$  are all hydrogen atoms and  $X^-$  is a bromide ion or an iodide ion,  $R^7$  and  $R^8$  are not both cyclohexyl groups or allyl groups.

2. (previously presented) The compound of claim 1, wherein  $R^1$ ,  $R^{1'}$ ,  $R^2$ ,  $R^{2'}$ ,  $R^3$ ,  $R^{3'}$ ,  $R^4$ ,  $R^{4'}$ ,  $R^5$ ,  $R^{5'}$ ,  $R^6$ , and  $R^{6'}$  of the compound represented by the formula (I) are groups independently selected from the group consisting of:

(i) a hydrogen atom;

(xiv) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,

a  $C_1$  to  $C_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a cyano group,

$-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),

a nitro group,

a carbamoyl group,

an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,

an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,

$-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a halogen atom, and

$-S-R$ ,  $-SO-R$ , or  $-SO_2-R$  (where  $R$  is a  $C_1$  to  $C_4$  alkyl group that may be branched);

or may be substituted with  $-O-CH_2-O-$  or  $-O-(CH_2)_2-O-$  at positions 3 and 4 taken together; and

(xv) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

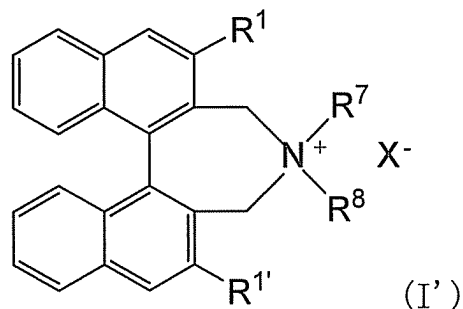
a  $C_1$  to  $C_4$  alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
a halogen atom.

3. (Original) The compound of claim 2, wherein R<sup>1</sup>, R<sup>1'</sup>, R<sup>2</sup>, R<sup>2'</sup>, R<sup>3</sup>, R<sup>3'</sup>, R<sup>4</sup>, R<sup>4'</sup>, R<sup>5</sup>, R<sup>5'</sup>, R<sup>6</sup>, and R<sup>6'</sup> of the compound represented by the formula (I) are groups independently selected from the group consisting of a hydrogen atom, a 3,4,5-trifluorophenyl group, a 3,4,5-trichlorophenyl group, a 3,4-difluorophenyl group, a 3-nitrophenyl group, a 3-cyanophenyl group, a benzothiophenyl-2-yl group, a 3,5-difluorophenyl group, a 3-trifluoromethylphenyl group, a 2,4-difluorophenyl group, a 3-methylsulfonylphenyl group, and a 2,3-bis(trifluoromethyl)phenyl group.

4. (previously presented) The compound of claim 1, wherein the compound represented by the formula (I) is a compound represented by the following formula (I'):



(where R<sup>1</sup> and R<sup>1'</sup> are groups independently selected from the group consisting of a hydrogen atom, a 3,4,5-trifluorophenyl group, a 3,4,5-trichlorophenyl group, a 3,4-difluorophenyl group, a 3-nitrophenyl group, a 3-cyanophenyl group, a benzothiophenyl-2-yl group, a 3,5-difluorophenyl group, a 3-trifluoromethylphenyl group, a 2,4-difluorophenyl group, a 3-methylsulfonylphenyl group, and a 2,3-bis(trifluoromethyl)phenyl group, and R<sup>7</sup>, R<sup>8</sup> and X<sup>-</sup> are groups independently as defined in claim 1).

5. (previously presented) The compound of claim 1, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are groups independently selected from the group consisting of:

(ii) a C<sub>1</sub> to C<sub>12</sub> alkyl group that may be branched or form a cyclic group;  
and

(xii) -(CH<sub>2</sub>)<sub>u</sub>-OR<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

- (1) a hydrogen atom,
- (2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
- (3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:
  - a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,



an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom, and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

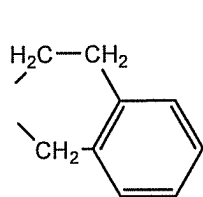
a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be  
 branched), and  
 a halogen atom,  
 and u is an integer of 1 to 12).

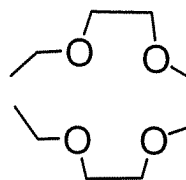
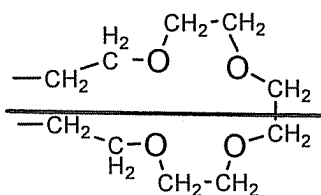
6. (Original) The compound of claim 5, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are groups independently selected from the group consisting of a methyl group, an ethyl group, an n-butyl group, an isobutyl group, an n-decyl group, and a cyclohexyl group.

7. (Original) The compound of claim 6, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are the same.

8. (Currently amended) The compound of claim 1, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are taken together to form a divalent group selected from the group consisting of: -(CH<sub>2</sub>)<sub>m</sub>- (where m is an integer from 2 to 8);

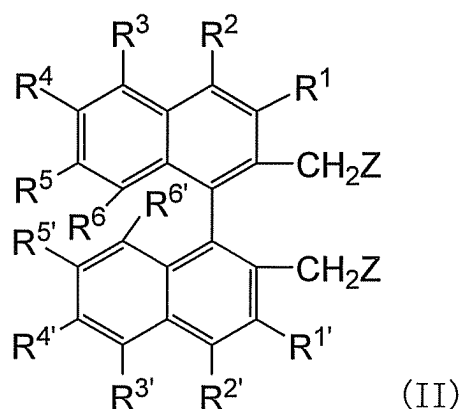


; and

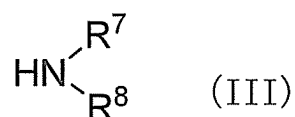


9. (Currently amended) A method for producing the compound represented by the formula (I) of claim 1, comprising:

a step of reacting a compound represented by the following formula (II):



with a secondary amine represented by the following formula (III):



in an organic solvent in the presence of an acid scavenging agent,

wherein in the formula (II),  $R^1$ ,  $R^{1'}$ ,  $R^2$ ,  $R^{2'}$ ,  $R^3$ ,  $R^{3'}$ ,  $R^4$ ,  $R^{4'}$ ,  $R^5$ ,  $R^{5'}$ ,  $R^6$ , and  $R^{6'}$  are groups independently selected from the group consisting of:

- (i) a hydrogen atom;
- (ii)  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group);
- (iii) a cyano group;
- (iv) a nitro group;
- (v) a carbamoyl group;
- (vi) an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group;
- (vii) an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group;
- (viii)  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched);
- (ix) a  $C_1$  to  $C_6$  alkyl group that may be branched or form a cyclic group;

(x) a C<sub>2</sub> to C<sub>6</sub> alkenyl group that may be branched or form a cyclic group;

(xi) a C<sub>2</sub> to C<sub>6</sub> alkynyl group that may be branched or form a cyclic group;

(xii) an aralkyl group, wherein the aryl moiety of the aralkyl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(xiii) a heteroaralkyl group having a heteroaryl moiety, wherein the heteroaryl moiety may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each

independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(xiv) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
a halogen atom, and  
-S-R, -SO-R, or -SO<sub>2</sub>-R (where R is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched);  
or may be substituted with -O-CH<sub>2</sub>-O- or -O-(CH<sub>2</sub>)<sub>2</sub>-O- at positions 3 and 4 taken together; and  
(xv) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:  
a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
and  
a halogen atom;  
and  
Z is a halogen atom, and  
in the formula (III), R<sup>7</sup> and R<sup>8</sup> are groups independently selected from the group consisting of:  
(i) a hydrogen atom;

- (ii) a C<sub>1</sub> to C<sub>12</sub> alkyl group that may be branched or form a cyclic group;
  - (iii) a C<sub>2</sub> to C<sub>12</sub> alkenyl group that may be branched or form a cyclic group;
  - (iv) a C<sub>2</sub> to C<sub>12</sub> alkynyl group that may be branched or form a cyclic group;
  - (v) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:
    - a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
    - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
    - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
    - a cyano group,
    - NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),
    - a nitro group,
    - a carbamoyl group,
    - an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
    - an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
    - NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
- and
- a halogen atom;
  - (vi) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:
    - a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
    - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
    - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each

independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(vii) -(CH<sub>2</sub>)<sub>p</sub>CONR<sup>10</sup>R<sup>11</sup> (where R<sup>10</sup> and R<sup>11</sup> are each independently a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) a C<sub>2</sub> to C<sub>6</sub> alkenyl group that may be branched or form a cyclic group ;

(4) a C<sub>2</sub> to C<sub>6</sub> alkynyl group that may be branched or form a cyclic group ;

(5) an aralkyl group, wherein the aryl moiety of the aralkyl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>



alkyl)carbamoyl group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched), and

a halogen atom;

(6) a heteroaralkyl group having a heteroaryl moiety, wherein the heteroaryl moiety may be substituted with at least one group selected from the group consisting of:

a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched,

a  $\text{C}_1$  to  $\text{C}_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched, a cyano group,  $\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group), a nitro group, a carbamoyl group, an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

(7) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and

(8) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a

carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and  $p$   $[[n]]$  is an integer from 1 to 12);

(viii) -(CH<sub>2</sub>)<sub>q</sub>CONR<sup>12</sup>R<sup>13</sup> (where R<sup>12</sup> and R<sup>13</sup> are groups independently selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

- a nitro group,
- a carbamoyl group,
- an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
- an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
- NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and
- a halogen atom; and
- (4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:
  - a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
  - a cyano group,
  - NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),
  - a nitro group,
  - a carbamoyl group,
  - an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and
  - a halogen atom;
- and g [[n]] is an integer from 1 to 12);
- (ix) -(CH<sub>2</sub>)<sub>n</sub>NR<sup>12</sup>COR<sup>13</sup> (where R<sup>12</sup> and R<sup>13</sup> are groups independently selected from the group consisting of:
  - (1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;  
(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and  
(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
 $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,  
 an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,  
 $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched), and

a halogen atom;  
 and  $r$   $[[n]]$  is an integer from 1 to 12);

(x)  $-(CH_2)_sNR^{12}R^{13}$  (where  $R^{12}$  and  $R^{13}$  are groups independently selected from the group consisting of:

(1) a hydrogen atom;  
 (2) a  $C_1$  to  $C_4$  alkyl group that may be branched;  
 (3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,  
 a  $C_1$  to  $C_5$  alkoxy group that may be branched,  
 an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a cyano group,  
 $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,

- an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
 a halogen atom; and  
 (4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:  
 a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
 a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
 an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
 a cyano group,  
 -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
 a halogen atom;  
 and  $\underline{s}$   $[[n]]$  is an integer from 1 to 12);  
 (xi) -(CH<sub>2</sub>)<sub>t</sub>Y-OR<sup>12</sup> (where Y is a C<sub>1</sub> to C<sub>4</sub> divalent saturated hydrocarbon group that may be branched, and R<sup>12</sup> is a group selected from the group consisting of:  
 (1) a hydrogen atom;  
 (2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,



-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and t  $\lfloor [n] \rfloor$  is an integer from 1 to 12);

(xii) -(CH<sub>2</sub>)<sub>u</sub>-OR<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and n is an integer from 1 to 12;

(xiii) -(CH<sub>2</sub>)<sub>v</sub>-S-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and  
(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,

a carbamoyl group,  
 an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be  
 branched), and

a halogen atom;

and  $\underline{y}$  [[n]] is an integer from 1 to 12);

(xiv) -(CH<sub>2</sub>)<sub>w</sub>-SO-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group  
 consisting of:

- (1) a hydrogen atom;
- (2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;
- (3) an aryl group, wherein the aryl group may be substituted with

at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
 a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
 an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group  
 that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each  
 independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a  
 carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>  
 alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that  
 may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen  
 atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be  
 branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and w [[n]] is an integer from 1 to 12); and

(xv) -(CH<sub>2</sub>)<sub>x</sub>-SO<sub>2</sub>-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each

independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

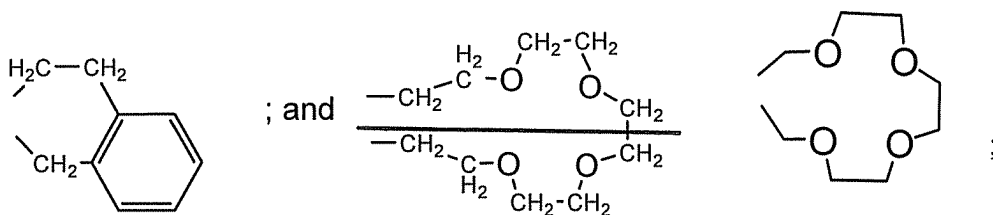
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

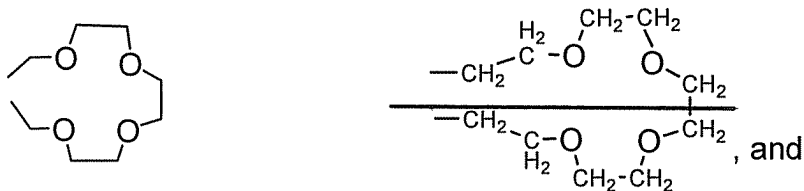
$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched), and

a halogen atom;

and  $[[n]]$   $\underline{x}$  is an integer from 1 to 12); or  $\text{R}^7$  and  $\text{R}^8$  are taken together to form a divalent group selected from the group consisting of:  $\text{-(CH}_2)_m\text{-}$  (where  $m$  is an integer from 2 to 8);



provided that in a case where  $\text{R}^1, \text{R}^{1'}, \text{R}^2, \text{R}^{2'}, \text{R}^3, \text{R}^{3'}, \text{R}^4, \text{R}^{4'}, \text{R}^5, \text{R}^{5'}, \text{R}^6$ , and  $\text{R}^{6'}$  are all hydrogen atoms and  $\text{X}^-$  is a halide anion,  $\text{R}^7$  and  $\text{R}^8$  are not both methyl groups, a combination of a methyl group and an n-butyl group, a combination of a methyl group and an isopropyl group, or a combination of an allyl group and a hydrogen atom, or  $\text{R}^7$  and  $\text{R}^8$  are not taken together to form  $\text{-(CH}_2)_4\text{-}$ ,  $\text{-(CH}_2)_5\text{-}$  or



further provided that in a case where  $\text{R}^1, \text{R}^{1'}, \text{R}^2, \text{R}^{2'}, \text{R}^3, \text{R}^{3'}, \text{R}^4, \text{R}^{4'}, \text{R}^5, \text{R}^{5'}, \text{R}^6$ , and  $\text{R}^{6'}$  are all hydrogen atoms and  $\text{X}^-$  is a bromide ion or an iodide ion,  $\text{R}^7$  and  $\text{R}^8$  are not both cyclohexyl groups or allyl groups.

10. (previously presented) The method of claim 9, wherein  $R^1$ ,  $R^{1'}$ ,  $R^2$ ,  $R^{2'}$ ,  $R^3$ ,  $R^{3'}$ ,  $R^4$ ,  $R^{4'}$ ,  $R^5$ ,  $R^{5'}$ ,  $R^6$ , and  $R^{6'}$  of the compound represented by the formula (II) are groups independently selected from the group consisting of:

(i) a hydrogen atom;

(xiv) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,

a  $C_1$  to  $C_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a cyano group,

$-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),

a nitro group,

a carbamoyl group,

an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,

an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,

$-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a halogen atom, and

$-S-R$ ,  $-SO-R$ , or  $-SO_2-R$  (where  $R$  is a  $C_1$  to  $C_4$  alkyl group that may be branched);

or may be substituted with  $-O-CH_2-O-$  or  $-O-(CH_2)_2-O-$  at positions 3 and 4 taken together; and

(xv) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,

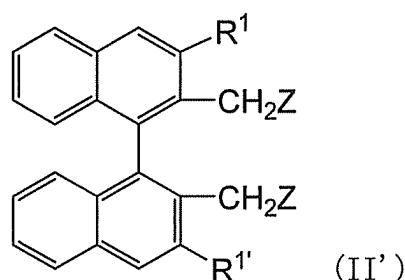


a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
a halogen atom.

11. (Original) The method of claim 10, wherein R<sup>1</sup>, R<sup>1'</sup>, R<sup>2</sup>, R<sup>2'</sup>, R<sup>3</sup>, R<sup>3'</sup>, R<sup>4</sup>, R<sup>4'</sup>, R<sup>5</sup>, R<sup>5'</sup>, R<sup>6</sup>, and R<sup>6'</sup> of the compound represented by the formula (II) are groups independently selected from the group consisting of a hydrogen atom, a 3,4,5-trifluorophenyl group, a 3,4,5-trichlorophenyl group, a 3,4-difluorophenyl group, a 3-nitrophenyl group, a 3-cyanophenyl group, a benzothiophenyl-2-yl group, a 3,5-difluorophenyl group, a 3-trifluoromethylphenyl group, a 2,4-difluorophenyl group, a 3-methylsulfonylphenyl group, and a 2,3-bis(trifluoromethyl)phenyl group.

12. (previously presented) The method of claim 9, wherein the compound represented by the formula (II) is a compound represented by the following formula (II'):



(where  $R^1$  and  $R^{1'}$  are groups independently selected from the group consisting of a hydrogen atom, a 3,4,5-trifluorophenyl group, a 3,4,5-trichlorophenyl group, a 3,4-difluorophenyl group, a 3-nitrophenyl group, a 3-cyanophenyl group, a benzothiophenyl-2-yl group, a 3,5-difluorophenyl group, a 3-trifluoromethylphenyl group, a 2,4-difluorophenyl group, a 3-methylsulfonylphenyl group, and a 2,3-bis(trifluoromethyl)phenyl group, and  $R^7$ ,  $R^8$  and  $Z$  are groups independently as defined in claim 9).

13. (previously presented) The method of claim 9, wherein  $R^7$  and  $R^8$  of the secondary amine represented by the formula (III) are groups independently selected from the group consisting of:

(ii) a  $C_1$  to  $C_{12}$  alkyl group that may be branched or form a cyclic group;  
and

(xii)  $-(CH_2)_u-OR^{12}$  (where  $R^{12}$  is a group selected from the group consisting of:

- (1) a hydrogen atom,
- (2) a  $C_1$  to  $C_4$  alkyl group that may be branched,
- (3) an aryl group, wherein the aryl group may be substituted with

at least one group selected from the group consisting of:

- a  $C_1$  to  $C_4$  alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom, and  
(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

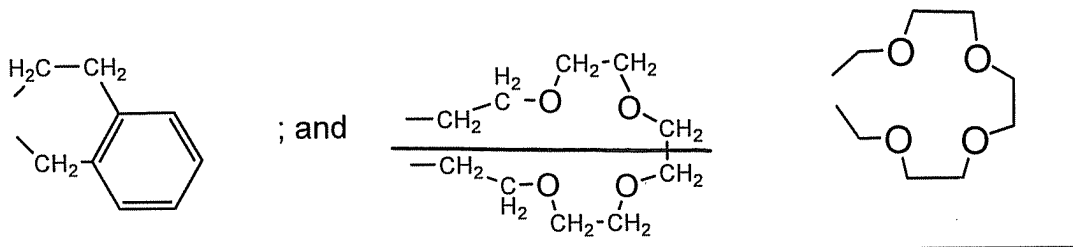
a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,

a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
a halogen atom,  
and u is an integer of 1 to 12).

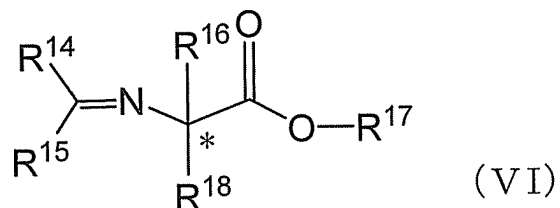
14. (previously presented) The method of claim 13, wherein R<sup>7</sup> and R<sup>8</sup> of the secondary amine represented by the formula (III) are groups independently selected from the group consisting of a methyl group, an ethyl group, an n-butyl group, an isobutyl group, an n-decyl group, and a cyclohexyl group.

15. (previously presented) The method of claim 14, wherein R<sup>7</sup> and R<sup>8</sup> of the secondary amine represented by the formula (III) are the same.

16. (Currently amended) The method of claim 9, wherein R<sup>7</sup> and R<sup>8</sup> of the secondary amine represented by the formula (III) are taken together to form a divalent group selected from the group consisting of:  $-(CH_2)_m-$   $-(CH_2)_y-$  (where m y is an integer from 2 to 8);

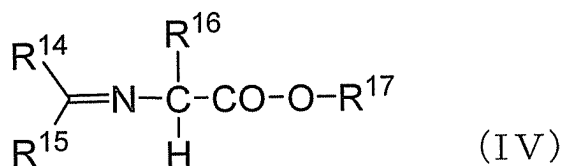


17. (Withdrawn) A method for stereoselectively producing a compound represented by the formula (VI):



comprising:

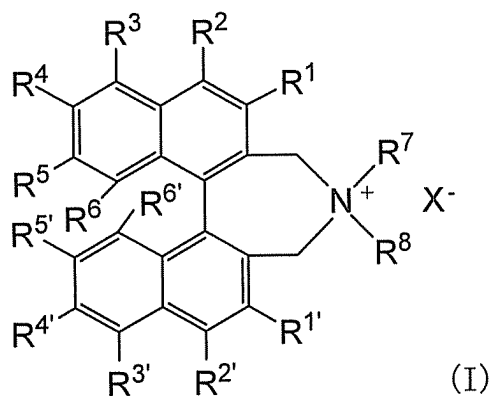
alkylating a compound represented by the formula (IV)



with a compound of the formula (V):



using a compound represented by the formula (I) that is pure with respect to axis symmetry as a phase-transfer catalyst:



in a medium in the presence of an inorganic base,

wherein in the formula (I),  $\text{R}^1, \text{R}^{1'}, \text{R}^2, \text{R}^{2'}, \text{R}^3, \text{R}^{3'}, \text{R}^4, \text{R}^{4'}, \text{R}^5, \text{R}^{5'}, \text{R}^6$ , and  $\text{R}^{6'}$  are groups independently selected from the group consisting of:

(i) a hydrogen atom;

- (ii)  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group);
- (iii) a cyano group;
- (iv) a nitro group;
- (v) a carbamoyl group;
- (vi) an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group;
- (vii) an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group;
- (viii)  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched);
- (ix) a  $C_1$  to  $C_6$  alkyl group that may be branched or form a cyclic group;
- (x) a  $C_2$  to  $C_6$  alkenyl group that may be branched or form a cyclic group;
- (xi) a  $C_2$  to  $C_6$  alkynyl group that may be branched or form a cyclic group;
- (xii) an aralkyl group, wherein the aryl moiety of the aralkyl group may be substituted with at least one group selected from the group consisting of:
  - a  $C_1$  to  $C_4$  alkyl group that may be branched,
  - a  $C_1$  to  $C_5$  alkoxy group that may be branched,
  - an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),
  - a cyano group,
  - $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),
  - a nitro group,
  - a carbamoyl group,
  - an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,
  - an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,

- NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
- and
- a halogen atom;
- (xiii) a heteroaralkyl group having a heteroaryl moiety, wherein the heteroaryl moiety may be substituted with at least one group selected from the group consisting of:
- a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
  - a cyano group,
  - NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),
  - a nitro group,
  - a carbamoyl group,
  - an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
- and
- a halogen atom;
- (xiv) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:
- a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a

carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a halogen atom, and

-S(O)<sub>n</sub>-R (where n is 0, 1 or 2, and R is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched);

or may be substituted with -O-(CH<sub>2</sub>)<sub>m</sub>-O- (where m is 1 or 2) at positions 3 and 4 taken together; and

(xv) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,



an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
and  
a halogen atom; and  
R<sup>7</sup> and R<sup>8</sup> are each independently a monovalent organic group or are taken together to form a divalent organic group,  
X<sup>-</sup> is a halide anion,  
in the formulae (IV) and (VI),  
R<sup>14</sup> and R<sup>15</sup> are each independently  
(i) a hydrogen atom; or  
(ii) an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched, or a halogen atom;  
with the proviso the case where both R<sup>14</sup> and R<sup>15</sup> are hydrogen atoms is excluded,  
R<sup>16</sup> is a group selected from the group consisting of:  
(i) a hydrogen atom;  
(ii) a C<sub>1</sub> to C<sub>10</sub> alkyl group that may be branched or form a cyclic group;  
(iii) a C<sub>2</sub> to C<sub>6</sub> alkenyl group that may be branched or form a cyclic group;  
(iv) a C<sub>2</sub> to C<sub>6</sub> alkynyl group that may be branched or form a cyclic group;  
(v) an aralkyl group, wherein the aryl group of the aralkyl group may be substituted with at least one group selected from the group consisting of:  
a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>

alkyl)carbamoyl group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

and

a halogen atom;

(vi) a heteroaralkyl group having a heteroaryl moiety, wherein the heteroaryl moiety may be substituted with at least one group selected from the group consisting of:

a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched,

a  $\text{C}_1$  to  $\text{C}_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched, a cyano group,  $\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group), a nitro group, a carbamoyl group, an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

- NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
- and
- a halogen atom;
- (vii) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:
- a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
  - a cyano group,
  - NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),
  - a nitro group,
  - a carbamoyl group,
  - an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
- and
- a halogen atom; and
- (viii) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:
- a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>

alkyl)carbamoyl group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

and

a halogen atom;

$\text{R}^{17}$  is a  $\text{C}_1$  to  $\text{C}_8$  alkyl group that may be branched or form a cyclic group),

in the formulae (V) and (VI),

$\text{R}^{18}$  is a group selected from the group consisting of:

(i) a  $\text{C}_1$  to  $\text{C}_{10}$  alkyl group that may be branched or form a cyclic group;

(ii) a  $\text{C}_3$  to  $\text{C}_9$  allyl group or substituted allyl group that may be branched or form a cyclic group;

(iii) a  $\text{C}_2$  to  $\text{C}_6$  alkenyl group that may be branched or form a cyclic group;

(iv) a  $\text{C}_2$  to  $\text{C}_6$  alkynyl group that may be branched or form a cyclic group;

(v) an aralkyl group, wherein the aryl moiety of the aralkyl group may be substituted with at least one group selected from the group consisting of;

a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched,

a  $\text{C}_1$  to  $\text{C}_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched, a cyano group,  $\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group), a nitro group, a carbamoyl group, an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom  
or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;  
(vi) a heteroaralkyl group having a heteroaryl moiety, wherein the  
heteroaryl moiety may be substituted with at least one group selected from the  
group

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that  
may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each  
independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a  
carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>  
alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that  
may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom  
or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(vii) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of;

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(viii) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
and  
a halogen atom; and  
(ix) a C<sub>3</sub> to C<sub>9</sub> propargyl group or substituted propargyl group that may be branched, and  
in the formula (V),  
W is a functional group having a leaving ability, and  
in the formula (VI),  
\* shows a newly produced asymmetric center.

18. (Withdrawn) The method of claim 17, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are groups independently selected from the group consisting of:

- (i) a C<sub>1</sub> to C<sub>12</sub> alkyl group that may be branched or form a cyclic group and/or may be substituted with a halogen atom;
- (ii) a C<sub>2</sub> to C<sub>12</sub> alkenyl group that may be branched or form a cyclic group and/or may be substituted with a halogen atom;
- (iii) a C<sub>2</sub> to C<sub>12</sub> alkynyl group that may be branched or form a cyclic group and/or may be substituted with a halogen atom;
- (iv) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:
  - a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each

independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

and

a halogen atom;

(v) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,



-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
and

a halogen atom;

(vi) -(CH<sub>2</sub>)<sub>n</sub>CONR<sup>10</sup>R<sup>11</sup> (where R<sup>10</sup> and R<sup>11</sup> are groups independently selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) a C<sub>2</sub> to C<sub>6</sub> alkenyl group that may be branched or form a cyclic group ;

(4) a C<sub>2</sub> to C<sub>6</sub> alkynyl group that may be branched or form a cyclic group ;

(5) an aralkyl group, wherein the aryl moiety of the aralkyl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

(6) a heteroaralkyl group having a heteroaryl moiety, wherein the heteroaryl moiety may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

(7) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub>

alkyl)carbamoyl group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched), and

a halogen atom; and

(8) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched,

a  $\text{C}_1$  to  $\text{C}_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched, a cyano group,  $\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group), a nitro group, a carbamoyl group, an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group, or  $\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched),

a cyano group,

$\text{-NR}^{20}\text{R}^{21}$  (where  $\text{R}^{20}$  and  $\text{R}^{21}$  are each independently a hydrogen atom or a  $\text{C}_1$  to  $\text{C}_4$  alkyl group),

a nitro group,

a carbamoyl group,

an  $\text{N-(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

an  $\text{N,N-di(C}_1 \text{ to C}_4 \text{ alkyl)carbamoyl}$  group,

$\text{-NHCOR}^9$  (where  $\text{R}^9$  is a  $\text{C}_1$  to  $\text{C}_4$  alkyl group that may be branched), and

a halogen atom;

and n is an integer from 1 to 12);

(vii)  $-(CH_2)_nCONR^{12}R^{13}$  (where  $R^{12}$  and  $R^{13}$  are groups independently selected from the group consisting of:

(1) a hydrogen atom;

(2) a  $C_1$  to  $C_4$  alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,

a  $C_1$  to  $C_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a cyano group,

$-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),

a nitro group,

a carbamoyl group,

an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,

an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,

$-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,

a  $C_1$  to  $C_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and n is an integer from 1 to 12);

(viii) -(CH<sub>2</sub>)<sub>n</sub>NR<sup>12</sup>COR<sup>13</sup> (where R<sup>12</sup> and R<sup>13</sup> are groups independently selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and  
(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:  
a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;  
and n is an integer from 1 to 12);

(ix)  $-(CH_2)_nNR^{12}R^{13}$  (where  $R^{12}$  and  $R^{13}$  are groups independently selected from the group consisting of:

- (1) a hydrogen atom;
- (2) a  $C_1$  to  $C_4$  alkyl group that may be branched;
- (3) an aryl group, wherein the aryl group may be substituted with

at least one group selected from the group consisting of:

- a  $C_1$  to  $C_4$  alkyl group that may be branched,
- a  $C_1$  to  $C_5$  alkoxy group that may be branched,
- an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),
- a cyano group,
- $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),
- a nitro group,
- a carbamoyl group,
- an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,
- an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,
- $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

- a  $C_1$  to  $C_4$  alkyl group that may be branched,
- a  $C_1$  to  $C_5$  alkoxy group that may be branched,
- an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a

carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and n is an integer from 1 to 12);

(x) -(CH<sub>2</sub>)<sub>n</sub>Y-OR<sup>12</sup> (where Y is a C<sub>1</sub> to C<sub>4</sub> divalent saturated hydrocarbon group that may be branched, and R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,



-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom; and

(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and n is an integer from 1 to 12);

(xi)  $-(CH_2)_n-OR^{12}$  (where  $R^{12}$  is a group selected from the group consisting of:

- (1) a hydrogen atom;
- (2) a  $C_1$  to  $C_4$  alkyl group that may be branched;
- (3) an aryl group, wherein the aryl group may be substituted with

at least one group selected from the group consisting of:

- a  $C_1$  to  $C_4$  alkyl group that may be branched,
- a  $C_1$  to  $C_5$  alkoxy group that may be branched,
- an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an  $N$ -( $C_1$  to  $C_4$  alkyl)carbamoyl group, an  $N,N$ -di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

- a cyano group,
- $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),
- a nitro group,
- a carbamoyl group,
- an  $N$ -( $C_1$  to  $C_4$  alkyl)carbamoyl group,
- an  $N,N$ -di( $C_1$  to  $C_4$  alkyl)carbamoyl group,
- $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched), and

- a halogen atom; and

- (4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

- a  $C_1$  to  $C_4$  alkyl group that may be branched,
- a  $C_1$  to  $C_5$  alkoxy group that may be branched,
- an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a

carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,

a carbamoyl group,

an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,

-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom;

and n is an integer from 1 to 12);

(xii) -(CH<sub>2</sub>)<sub>n</sub>-S-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:

(1) a hydrogen atom;

(2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;

(3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,

a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,

an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,

-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

- a nitro group,
  - a carbamoyl group,
  - an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and
  - a halogen atom; and
  - (4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:
    - a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
    - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
    - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
    - a cyano group,
    - NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),
    - a nitro group,
    - a carbamoyl group,
    - an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
    - an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
    - NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and
    - a halogen atom;
- and n is an integer from 1 to 12);
- (xiii) -(CH<sub>2</sub>)<sub>n</sub>-SO-R<sup>12</sup> (where R<sup>12</sup> is a group selected from the group consisting of:
- (1) a hydrogen atom;

- (2) a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched;
- (3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:
- a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),
  - a cyano group,
  - NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),
  - a nitro group,
  - a carbamoyl group,
  - an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,
  - NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and
  - a halogen atom; and
- (4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:
- a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,
  - a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,
  - an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
 $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,  
 an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,  
 $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched), and

a halogen atom;

and  $n$  is an integer from 1 to 12); and

(xiv)  $-(CH_2)_n-SO_2-R^{12}$  (where  $R^{12}$  is a group selected from the group consisting of:

- (1) a hydrogen atom;
- (2) a  $C_1$  to  $C_4$  alkyl group that may be branched;
- (3) an aryl group, wherein the aryl group may be substituted with

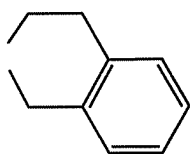
at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,  
 a  $C_1$  to  $C_5$  alkoxy group that may be branched,  
 an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

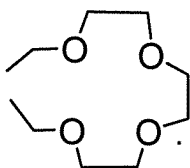
a cyano group,  
 $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,

an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
 a halogen atom; and  
 (4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:  
 a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
 a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
 an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),  
 a cyano group,  
 -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
 a nitro group,  
 a carbamoyl group,  
 an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
 -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
 a halogen atom;

and n is an integer from 1 to 12); or R<sup>7</sup> and R<sup>8</sup> are taken together to form a divalent group selected from the group consisting of: -(CH<sub>2</sub>)<sub>m</sub>- (where m is an integer from 2 to 8);



; and



19. (Withdrawn) The method of claim 18, wherein  $R^1$ ,  $R^{1'}$ ,  $R^2$ ,  $R^{2'}$ ,  $R^3$ ,  $R^{3'}$ ,  $R^4$ ,  $R^{4'}$ ,  $R^5$ ,  $R^{5'}$ ,  $R^6$ , and  $R^{6'}$  of the compound represented by the formula (I) are groups independently selected from the group consisting of:

(i) a hydrogen atom;

(xiv) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,

a  $C_1$  to  $C_5$  alkoxy group that may be branched,

an aryl group that may be substituted with a  $C_1$  to  $C_4$  alkyl group that may be branched, a cyano group,  $-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group), a nitro group, a carbamoyl group, an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group, an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group, or  $-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a cyano group,

$-NR^{20}R^{21}$  (where  $R^{20}$  and  $R^{21}$  are each independently a hydrogen atom or a  $C_1$  to  $C_4$  alkyl group),

a nitro group,

a carbamoyl group,

an N-( $C_1$  to  $C_4$  alkyl)carbamoyl group,

an N,N-di( $C_1$  to  $C_4$  alkyl)carbamoyl group,

$-NHCOR^9$  (where  $R^9$  is a  $C_1$  to  $C_4$  alkyl group that may be branched),

a halogen atom, and

$-S(O)_n-R$  (where  $n$  is 0, 1 or 2, and  $R$  is a  $C_1$  to  $C_4$  alkyl group that may be branched);

or may be substituted with  $-O-(CH_2)_m-O-$  (where  $m$  is 1 or 2) at positions 3 and 4 taken together; and

(xv) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a  $C_1$  to  $C_4$  alkyl group that may be branched,

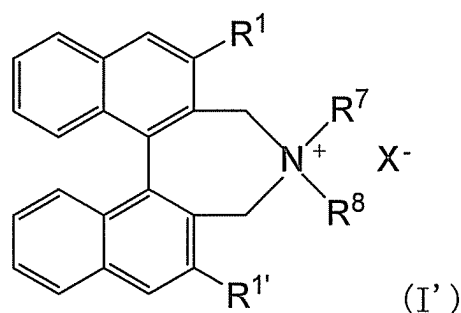


a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),  
a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
a halogen atom.

20. (Withdrawn) The method of claim 19, wherein R<sup>1</sup>, R<sup>1'</sup>, R<sup>2</sup>, R<sup>2'</sup>, R<sup>3</sup>, R<sup>3'</sup>, R<sup>4</sup>, R<sup>4'</sup>, R<sup>5</sup>, R<sup>5'</sup>, R<sup>6</sup>, and R<sup>6'</sup> of the compound represented by the formula (I) are groups independently selected from the group consisting of a hydrogen atom, a 3,4,5-trifluorophenyl group, a 3,4,5-trichlorophenyl group, a 3,4-difluorophenyl group, a 3-nitrophenyl group, a 3-cyanophenyl group, a benzothiophenyl-2-yl group, a 3,5-difluorophenyl group, a 3-trifluoromethylphenyl group, a 2,4-difluorophenyl group, a 3-methylsulfonylphenyl group, and a 2,3-bis(trifluoromethyl)phenyl group.

21. (Withdrawn) The method of claim 20, wherein the compound represented by the formula (I) is a compound represented by the following formula (I'):



(where  $R^1$  and  $R^{1'}$  are groups independently selected from the group consisting of a hydrogen atom, a 3,4,5-trifluorophenyl group, a 3,4,5-trichlorophenyl group, a 3,4-difluorophenyl group, a 3-nitrophenyl group, a 3-cyanophenyl group, a benzothiophenyl-2-yl group, a 3,5-difluorophenyl group, a 3-trifluoromethylphenyl group, a 2,4-difluorophenyl group, a 3-methylsulfonylphenyl group, and a 2,3-bis(trifluoromethyl)phenyl group, and  $R^7$ ,  $R^8$  and  $X^-$  are groups independently as defined in claim 17).

22. (Withdrawn) The method of claim 17, wherein  $R^7$  and  $R^8$  of the compound represented by the formula (I) are groups independently selected from the group consisting of:

(ii) a  $C_1$  to  $C_{12}$  alkyl group that may be branched or form a cyclic group;  
and

(xii)  $-(CH_2)_n-OR^{12}$  (where  $R^{12}$  is a group selected from the group consisting of:

- (1) a hydrogen atom,
- (2) a  $C_1$  to  $C_4$  alkyl group that may be branched,
- (3) an aryl group, wherein the aryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and

a halogen atom, and  
(4) a heteroaryl group, wherein the heteroaryl group may be substituted with at least one group selected from the group consisting of:

a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched,  
a C<sub>1</sub> to C<sub>5</sub> alkoxy group that may be branched,  
an aryl group that may be substituted with a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched, a cyano group, -NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group), a nitro group, a carbamoyl group, an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group, or -NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched),

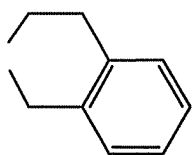
a cyano group,  
-NR<sup>20</sup>R<sup>21</sup> (where R<sup>20</sup> and R<sup>21</sup> are each independently a hydrogen atom or a C<sub>1</sub> to C<sub>4</sub> alkyl group),

a nitro group,  
a carbamoyl group,  
an N-(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
an N,N-di(C<sub>1</sub> to C<sub>4</sub> alkyl)carbamoyl group,  
-NHCOR<sup>9</sup> (where R<sup>9</sup> is a C<sub>1</sub> to C<sub>4</sub> alkyl group that may be branched), and  
a halogen atom,  
and n is an integer of 1 to 12.

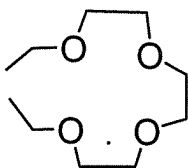
23. (Withdrawn) The method of claim 22, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are groups independently selected from the group consisting of a methyl group, an ethyl group, an n-butyl group, an isobutyl group, an n-decyl group, and a cyclohexyl group.

24. (Withdrawn) The method of claim 23, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are the same.

25. (Withdrawn) The method of claim 17, wherein R<sup>7</sup> and R<sup>8</sup> of the compound represented by the formula (I) are taken together to form a divalent group selected from the group consisting of: -(CH<sub>2</sub>)<sub>m</sub>- (where m is an integer from 2 to 8);



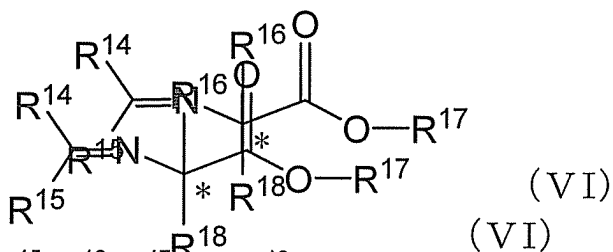
; and



26. (Withdrawn) The method of claim 17, wherein the compound represented by the formula (I) is used in a ratio of 0.001 mol % to 0.1 mol % per 1 mol of the compound represented by the formula (IV).

27. (Withdrawn) The method of claim 17, wherein the compound represented by the formula (I) is used in a ratio of 0.005 mol % to 0.05 mol % per 1 mol of the compound represented by the formula (IV).

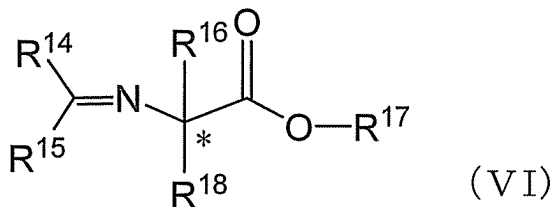
28. (Withdrawn) A method for producing an optically active  $\alpha$ -amino acid, comprising: hydrolyzing an imino group ( $R^{14}R^{15}C=N-$ ) and an ester group ( $-CO_2R^{17}$ ) of the compound represented by the formula (VI) that is obtained by the method of any one of claims 17 to 26, under an acidic condition:



(where  $R^{14}$ ,  $R^{15}$ ,  $R^{16}$ ,  $R^{17}$  and  $R^{18}$  are the same groups as defined above).

29. (Withdrawn) A method for producing an optically active  $\alpha$ -amino acid, comprising:

hydrolyzing an imino group ( $R^{14}R^{15}C=N-$ ) of the compound represented by the formula (VI) that is obtained by the method of any one of claims 17 to 26, under an acidic condition:

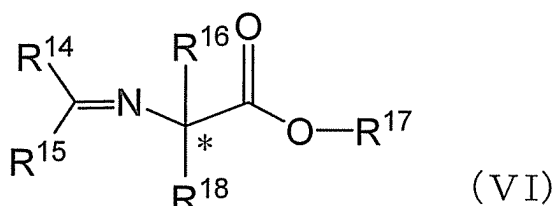


(where  $R^{14}$ ,  $R^{15}$ ,  $R^{16}$ ,  $R^{17}$  and  $R^{18}$  are the same groups as defined above), and

hydrolyzing an ester group ( $-CO_2R^{17}$ ) of the acid hydrolyzed product under an acidic or basic condition.

30. (Withdrawn) A method for producing an optically active  $\alpha$ -amino acid, comprising:

hydrolyzing an ester group ( $-\text{CO}_2\text{R}^{17}$ ) of the compound represented by the formula (VI) that is obtained by the method of any one of claims 17 to 26, under a basic condition:



(where  $\text{R}^{14}$ ,  $\text{R}^{15}$ ,  $\text{R}^{16}$ ,  $\text{R}^{17}$  and  $\text{R}^{18}$  are the same groups as defined above), and

hydrolyzing an imino group ( $\text{R}^{14}\text{R}^{15}\text{C}=\text{N}-$ ) of the basic hydrolyzed product under an acidic condition.